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ABSTRACT

Quality Assurance Program (QAP) integration activities were studied at eight Illinois community and junior colleges. Data collection involved telephone interviews with career deans at the colleges, 11 follow-up site observations, and attendance at a regional vocational education system directors meeting. When classroom observations occurred, evaluations were based on the amount of class time devoted to integrating academic skills into the instruction. The following information was collected for each school: the school's philosophical approach to integration, objectives developed to implement those philosophies, the school's performance criteria for their objectives, and various successes and problems that were occurring. The eight sites fell into three basic categories: those with broad and successful implementation, those with successful implementation in certain areas, and those with very limited success. General conclusions are as follows: (1) at some schools, the integration component of QAP was so thoroughly merged with Tech Prep and other local and state sponsored initiatives that it was impossible to say that one aspect of integration was totally QAP related; (2) those with the greatest problems were furthest along and working to resolve them; (3) a variety of approaches to integration existed; (4) some colleges successfully offered courses in ways other colleges had found impractical; and (5) virtually all instructors who came into contact with the concept of integration supported the idea. (YLB)

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Integration of Academic and Vocational Programs in Illinois Community Colleges

The Status of Integration Activities Funded Through the Quality Assurance Program

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INTRODUCTION

This study of Quality Assurance Program (QAP) integration activities at eight selected Illinois community and junior colleges was conducted at the request of the Department of Adult, Vocational and Technical Education as a part of the Illinois State Board of Education funded Sophisticated Technologies project. This report outlines each school's philosophical approach to integration; describes the objectives developed to implement those philosophies; identifies the school's performance criteria for their objectives; and discusses the various successes and problems that are occurring.

On August 23, 1990, ISBE staff, and Dr. Scott Johnson and Mr. Mike Harmon, University of Illinois, met to discuss the nature of the study and identify the colleges to be included. It was decided that eight sites would be studied, including one from each of the six community college regions, one from the Chicago suburban belt, and one from the City Colleges of Chicago.

During the August 23 meeting, ISBE staff agreed to provide the University with further guidance concerning the basic parameters of the study. In a September 5, 1990 letter to Dr. Johnson, ISBE staff suggested that the study be accomplished in four phases:

1. A meeting with QAP administrators at selected sites to review and clarify activities to be undertaken to implement locally established QAP integration goals;

2. Establishment and implementation of a plan to monitor procedures and activities through which the colleges sought to achieve their integration goals;

3. Evaluation of the colleges' success in meeting their goals as measured by locally determined performance standards; and

4. Documentation of the findings in a written report to ISBE, possibly as part of the teaching handbook being written under the Sophisticated Technologies project.

The study was designed to include a telephone interview with the principal QAP administrator at each college to clarify integration plans and determine what integration projects were underway, what they hoped to achieve, and the extent to which they felt that these goals were being met; and an on-site visit to discuss these programs with the faculty and students, assess their view of integration activities from a delivery-level perspective, and observe classes in which administrators and/or instructors felt that instructional techniques reflected in the integration activities that were being implemented.The specific content on which each class was evaluated included the involvement of students in reading, writing, mathematics, critical thinking, and problem solving.

In consideration of the nature of the study and the anticipated dissimilarity among the observation sites, a qualitative study design was chosen. It was further determined that data collected would be classified in accordance with the eight models of integration strategies identified by Grubb in 1990 for the National Center for Research in Vocational Education. These eight paradigms include:

1. Incorporating academic competencies into vocational courses;

2. Having academic instructors teach portions of vocational classes and serve as a resource for vocational instructors;

3. Making the academic curriculum more vocationally relevant;

4. Increasing the "alignment" between vocational and academic courses by using elements of each course in the other;

5. Establishing vocationally subject-specific academies within schools, and staffing each academy with both vocational and core academic instructors;

6. Replacing conventional departments with occupational clusters;

7. Establishing single-occupation high schools; and

8. Maintaining a traditional department structure but organizing students and faculty into "career paths" or occupational clusters.

In its implementation, the study deviated from the suggested plan of action in two ways. First, plans to interview students were dropped. The decision to not involve students directly was taken to keep the study as positive and non-threatening as possible. Consequently, assessing student involvement in and reaction to instructional and laboratory activities became an important part of the observation process where observations were permitted.

Second, the project staff decided to report the study results in a self-contained document rather than as a part of the "teaching handbook" being developed for the project. Because the integration activities planned and undertaken by the colleges were so diverse and specific to local needs and interests, distilling them into a single model approach did not seem feasible. Further, the nature of the activities at certain locations made site-specific public reporting of their efforts inappropriate.

Data collection involved telephone interviews with career deans at the various colleges, eleven follow-up on-site observations, and attendance at a regional vocational education system directors meeting. The observations were used to verify information that had been provided during the telephone interviews and, where possible, to directly observe the impact of the integration process on classroom instruction. During the course of the study, fourteen administrators and seventeen instructors were interviewed, and ten classes were observed; all observations lasted at least one hour. Additional integration information and documentation was informally gathered during interviews and observations.

When classroom observations occurred, evaluations were based on the amount of class time devoted to integrating academic skills into the instruction and the extent to which students were appropriately involved in the instruction. The concept of integration was operationalized to include time spent explicitly teaching lower-order mathematics, reading, and writing skills and higher-order critical thinking and problem solving skills. Critical thinking was loosely defined as identifying and processing of specific information and the

development of appropriate metacognitive skills. Problem solving included problem finding and the application of known information to the problem.

OBSERVATION RESULTS

Community College "A"

Community College "A" identified three integration objectives:

1. Develop an agricultural applied life science course which would be suitable for high school seniors as well as college students;

2. Develop an applied math course for high school students; and

3. Improve the relationship of certain chemistry and biology courses to selected health occupations courses.

The school's performance measures for these objectives were:

1. The developed course will be approved for presentation in one or more local high schools in the following year;

2. (The) math course will be approved for implementation the following year; and

3. Students will be surveyed to determine their perceptions of science course relevance.

According to a college dean, the agriculture program is currently being developed by three college agriculture teachers, one college life science teacher, and 14 local high school teachers. Because the University of Illinois has already developed a plant science course, the program will emphasize animal science.

Plans to develop the math course were dropped when it was discovered that a Center for Occupational Research and Development (CORD) program designed to meet the same needs was available commercially. In conjunction with the college's TechPrep grant, units from this course are being implemented in the local school districts. The dean sees this as a first step that will eventually lead to full implementation of the program.

The dean reports that high school personnel in surrounding counties have been very receptive to both the agriculture and math courses. In addition, high school personnel in another county have also been receptive to the agriculture program. However, the high school staff seem to believe that the CORD math program is not sufficiently rigorous and have not participated in its implementation.

Within the college, efforts to improve the relationship between science and health occupations courses are just now getting underway. The science areas to be reviewed have been identified: anatomy, physiology, psychology, and chemistry. Specific health occupations courses have not been identified. According to the college dean, this process is "not set up and going yet."

On-site observations were made in four classes: Physical Therapist Seminar; Agricultural Business, Agricultural Marketing, Principles of Soil Fertility; and Surgical Technology. This schedule was arranged by the college dean to display the college's integration efforts. In each class, the paradigm of incorporating academic content into vocational curricula was used.

The students in the Physical Therapist Seminar were involved in small group analysis of case studies relating to hypothetical clinical situations. From the information gathered through these case studies, and in conjunction with information available at a local medical college library, students were to write a research paper on a selected area of physical therapy.

Without exception, all students were engaged in reading case studies and writing responses to questions raised in the studies. Reading and writing activities were also required to complete the assigned research paper. A field trip was being planned to assist students who were not able to get the medical school library on their own. The instructor also explained how to gain access to the material in the library in case anyone wanted to go on their own.

The case studies were an excellent example of providing career-relevant critical thinking and problem solving experiences. These experiences included working in small groups to identify errors in the conclusions drawn in the case studies and recommending alternative treatments. No math activities were observed, and the instructor said that math skills are not emphasized in this course.

Surgical Technology was strictly a lecture course. Although the instructor used a variety of examples to illustrate equipment and its use, there was no evidence of students being required to engage in any of the activities being looked for in this study.

Similarly, Agricultural Marketing was a lecture course in which none of the selected indicators of integration were present. This course and Agricultural Business were both taught by the same instructor, and many students were in both courses.

The Agricultural Business class presented the opportunity to involve students in using basic math skills. However, many students seemed to be only minimally engaged in these operations. At infrequent intervals during the class students asked questions that indicated some level of involvement and critical thinking. While the instructor was always open to these questions and answered them fully, the questions seemed to stem more from individual initiative than instructional design. The instructor attempted to teach problem solving by modeling how to work through various problems. However, the rapid pace of the modeling and the lack of an opportunity for guided practice severely diminished the learning that appeared to take place. There were no reading and writing activities.

Community College "B"

Community College "B" has been actively engaged in integrating vocational and academic content in its curricula. Their philosophy of integration involves both integrating academic content into vocational classes and using academic instructors to teach portions of

vocational classes. These approaches are best exemplified by course offerings in the agriculture and nursing programs.

The Agriculture Department has traditionally preferred to have its instructors incorporate academic content into their classes, according to the department chair. This includes teaching extensive math, science, language arts, and higher order thinking skills in departmental courses. Agricultural Math is an example of this philosophy. The course was initially developed because the Agriculture Department wanted a discipline-specific math offering but the Math Department would not agree to teach such a course. Currently, the department is seeking approval to teach a computer science class because the Math Department's computer course involves only about 50% hands-on activities. According to the department head, the agriculture program seeks to increase hands-on work to 75-80% of the course.

The department uses a college wide asset testing program to help determine students' proficiency in reading and writing. The department head feels that these skills are critical for success in the program, especially since most textbooks are written at the 13+ grade level. Additionally, several of the horticulture and soils classes require students to write detailed research papers. Tutors and remedial classes are provided for students with documented deficiencies in the language arts areas.

Problem solving and critical thinking skills are emphasized throughout the program. Specific examples noted included learning experiences in greenhouse design that emphasize energy efficiency; economic and environmental considerations involved in crop fertilization, cultivation and yield; livestock evaluation; power mechanics troubleshooting; and interviewing skills.

Three classes were observed at Community College "B": Introduction to Agriculture, Animal Science; Agriculture, Agricultural Retailing and Agricultural Mechanization. In the Introduction to Agriculture class, math skills were utilized in determining the mineral content of various feeds, feed rates, and the calculation of actual and adjusted animal weaning weight. Additionally, Chicago Mercantile Exchange charts are posted around the room. In all, a variety of math concepts were effectively taught in occupationally meaningful ways.

While the instructor did an excellent job teaching students what factors they should consider when determining weaning rate, little time was spent on applying this knowledge to problem solving. The one exception to this was instruction in how to make ideal weaning rate calculations when part of the information required for the formula was unavailable. Writing and reading skills instruction was not observed.

The Agricultural Retailing class dealt primarily with efforts to determine appropriate uses of advertising when marketing products. Through the use of generally effective questioning, the teacher engaged most of the students in critical thinking at various times during the one hour lecture. None of the other indicators of academic integration (math, reading, writing, and problem solving) were observed, although the syllabus indicates that math skills are frequently used throughout the semester.

The Agricultural Mechanization syllabus and sample handouts indicate that the course requires considerable application of basic arithmetic, estimation and algebra skills. These computation skills and writing skills were not a part of the observed lesson. The students

were involved in reading technical manuals and an instructor-prepared small engine service procedure outline.

During the lesson the instructor spent considerable time teaching the students what to think about as they proceeded through a starter repair exercise. Instruction emphasized both content and process knowledge. An opportunity for guided practice was provided in a lab activity that immediately followed the lesson.

In contrast to the agriculture program, the Nursing Department relies heavily on other departments to provide basic academic instruction while emphasizing occupationally relevant higher order cognitive skills in its own classes. The course, Remedial Math for Nurses, is an example of this. The first half of the course is taught by a Math Department instructor who emphasizes correct mathematical approaches to problems and relates the instruction to health care situations to the greatest extent possible. The second half of the semester is taught by a nursing instructor who emphasizes the application of previously learned skills in a strictly discipline-specific context.

The Nursing Department is currently studying the possibility of working with the Foreign Language Department to develop a Practical Spanish for Nurses course. The course would be designed to insure that a member of the medical team would be able to effectively communicate with health care clients in predominantly Hispanic areas.

During a description of the integration program at Community College "B", the college dean identified two factors that may limit the success of these efforts. First, vocational instructors are sometimes reluctant to increase academic standards because they fear it will drive students out of their programs. Second, some of the instructors may not feel comforatble with the academic skills that they are being asked to teach. For these reasons it was recommended that all integration activities be undertaken in an environment that is as non-threatening as possible and that instructors be involved early on so that such concerns can be identified and dealt with as soon as possible.

Community College "C"

Community College "C" identified five objectives to be carried out as a part of its QAP integration process. They were:

1. (The college will) heighten awareness among both academic and career instructors of the need to educate "Renaissance Technicians" and technologically literate generalists.

2. Faculty will identify appropriate integration strategies for at least one course in each of the six college divisions, develop appropriate instructional materials and/or methods, implement the integration strategy, and evaluate the outcomes.

3. Faculty will identify professional development needs and participate in activities designed to address those needs.

4. Faculty and administrators will participate in activities designed to develop articulation agreements and working relationships with secondary vocational education programs and personnel.

5. Community College "C" will encourage career/vocational faculty and administrators to develop and implement a strategic plan for program revision and development.

Attainment of these goals was to be measured by these standards:

1. Collect participant feedback following awareness activities to document responses, collect action plans from secondary and post-secondary faculty for integration of academic and vocational education, and monitor progress toward action plan completion;

2. Faculty will collect student achievement data and develop subjective evaluations of integration strategies;

3. Attendance at and participation in stated activities will be documented by conference reports and travel vouchers;

4. Attendance at meetings, conferences and in-service sessions will be documented by conference reports and travel vouchers, and additional program specific articulation agreements will be developed and approved for implementation in the fall of 1990 and 1991; and

5. Approval for conference attendance, curriculum revision projects, new program development and articulation activities will be coordinated to focus efforts on identified strategic planning goals for the "Vocational Initiative."

Community College "C" has been quite successful at integrating vocational and academic instruction. This is not to say, however, that the process has been carried out in strict accordance with the objectives outlined above. Plainly, and for a variety of reasons, it has not. The essence of the objectives has been realized, however, as is evidenced by the scope of integration implementation at the school.

The second objective, identification of specific courses that would be targeted for integration, was dropped entirely. According to the dean, many community college students drop in and out of programs. "You cannot count on someone taking every course in a program, therefore you can't rely on them gaining integration-type skills a little bit at a time and synthesizing it into a whole upon completion of the program." Instead, the college is undertaking a program to teach student-relevant problem solving, critical thinking, and other higher order cognitive skills in each of its courses. It is this "student relevant" approach that embodies our integration effort.

A course in clinical chemistry exemplifies how this approach works. In the past, chemistry and medical laboratory technician courses had been taught as separate courses within the program. The chemistry instructor felt that a full semester of chemistry went beyond the needs of the analytical chemistry students, who were almost all technology students. In the instructor's opinion, the relevant chemical concepts could be effectively taught in about half a semester. At the same time, the allied health instructor faced the opposite problem: more instructional time was needed than the schedule allowed. Working together, they created the two semester class to solve both problems. In the class, eight weeks of instruction are provided in basic chemistry followed by 24 weeks of instruction that expands theoretical concepts into practical skills.

Similar cooperative ties are being developed between various career programs and the physics program, according to both a physics teacher and the vocational technology chair. The vocational technology chair believes these initiatives will replace earlier integration efforts in which students took courses such as technical math and applied physics. In this chair's view, having academic teachers try to teach vocationally relevant courses without a cooperative structure "wasn't quite right." The technical, or applied, courses generally were just watered down versions of existing transfer courses, rather than specifically targeted instruction. The vocational technology chair indicated that the cooperative curriculum development efforts between teachers in the various departments are giving instructors a greater incentive to make the new classes work.

Not all of the collaborative programs have involved technical programs with the science department. When an agriculture instructor began working on an agricultural ethics program, advice was sought from the liberal arts chair who teaches ethics courses in the philosophy department. Although the agriculture instructor teaches the course alone, the syllabus reflects the contributions of the liberal arts chair.

The liberal arts chair was also involved in another multi-departmental integration activity. When local business leaders complained to the chair that desk top publishing was not being taught at the college, and because the school had no graphic arts program, the chair and other administrators obtained a computer for the art department. The art instructor was willing to teach desk top publishing and computer-generated art, but had very little computer experience. So, the instructor began working with the data processing instructors to develop the skills needed to carry out the new teaching assignment.

Not all integration activities at Community College "C" have been cooperative. A drafting instructor spends about 10-15% of the instructional time in a tool design class reviewing and reinforcing basic trigonometry skills. Contrary to the opinion of the vocational technology chair, the drafting instructor feels that the technical math courses have been a big help to the drafting students, with about 80% of the math course content being directly applicable to the drafting program. The drafting instructor defines the descriptive geometry class as a problem solving class, and cites various examples of how critical thinking and problem finding skills are required to complete class assignments.

According to the management information systems chair, math skills are also important for students in the business programs. Skills in using linear measurement, percentages, and decimals are all reinforced in a number of MIS courses, according to the management information systems chair. So, too, are oral and written communication skills; the department integrates these activities by participating in a Writing Across the Curriculum program. The management information systems chair points to exercises in business letter writing, proof reading, and managerial decision making as evidence of instruction in higher order cognitive skills.

Despite these integration efforts, a college administrator sees a "disjuncture" between vocational and academic instruction. This administrator feels that most of the inroads that the college has made have been philosophical; that the full potential of the QAP integration and TechPrep movement has yet to be realized. The administrator sees the college dean as the "czar" of TechPrep, and observes that the dean's philosophy of integration is the college's philosophy. That philosophy emphasizes that integration is not an end unto itself, but is a starting point for improving the generalizability of instruction. In discussions

regarding this view, the college dean pointed out that full implementation of this philosophy requires a change in the basic structure of instruction from credit hour completion to competency attainment. This, according to the college dean, will not happen unless and until funding formulas move away from a credit hour generation basis.

No classroom observations were conducted at Community College "C" during the QAP visit. The college dean repeatedly apologized for the fact that the large number of interviews scheduled made observations virtually impossible. This is not seen as detracting from the study, however. During earlier observation visits to the college, classes in management information systems, drafting, computer-assisted drafting, electronics, and health care provided ample opportunity to verify that the college is, in fact, heavily involved in vocational-academic integration. A final indicator of how much the school has done is their realization of how much more needs to be done. Institutions that have not made substantial progress do not seem to recognize the difficulty of establishing an integrated learning system.

QAP and other funding sources have been instrumental in the implementation of activities to meet the third objective, inservice training programs. According to the dean, a number of vocational and academic faculty have used the funds to attend off-campus conferences, conventions, and workshops. Additionally, the school has used the money to hold similar events on campus. In accordance with another activity specified under this objective, the interdisciplinary integration efforts at Community College "C" have been aided by changing the structure of the vocational advisory committees to include a member of the academic faculty on each committee.

The fourth objective requires faculty and administrators to engage in activities to develop articulation agreements with secondary programs and personnel. The dean stated that articulation programs with the districts served by the college are in place and are currently being updated. It was reported that most high school teachers have been positive about the agreements but that some guidance counselors have resisted the idea. It was further reported that efforts are under way to expand the counselors' awareness of the programs in the hope that this will lead to a more favorable impression.

The final point calls for the development and implementation of a strategic plan for program revision and development. The dean noted that a component of the college's philosophy regarding integration is that the success or failure of the program ultimately rests with the faculty. It is the administration's responsibility to identify faculty who accept the concept and then support them in their efforts.

Community College "D"

Administrators at Community College "D" identified two QAP integration objectives:

1. Instructors in academic disciplines will gain a better understanding of the vocational education students in their academic classes; and

2. The enrollment of occupational students in academic courses that are required for certificates and degrees will be assessed.

The evaluation standards for these objectives were:

1. Each instructor (in the Life and Social Science and Mathematics and Physical Science Divisions) will submit to his/her division chair a one-page summary of activities with copies to the two occupational division chairs, and the English and Humanities Division instructor will submit to (his/her) division chair a report with recommendations for any curricular changes and will provide copies to the two occupational division chairs; and

2. A report to the Vice President for Instructional Services will delineate, by program, resulting data regarding occupational student participation in academic courses.

To implement the first objective, the college specified activities in which four Life and Social Science faculty, four Mathematics and Physical Science faculty, and one English and Humanities faculty would be given a total of four hours release time per division. This time was to be used to observe vocational classes and "subsequently (interact) with faculty and students as appropriate." The one English and Humanities instructor also was to visit area businesses.

In a telephone interview, a college administrator reported that these release-time observations had taken place and that the academic staff thought that the opportunity to visit the vocational classes was "great." The college administrator added that as a result of these experiences, academic staff had become more attuned to what the total school experience is like for vocational-technical students. The college administrator further expressed the hope that this experience would lead to curriculum changes, although the college has no formal mechanism for measuring such changes.

An on-site visit eight weeks later revealed a mistake had been made. Of the nine faculty who were to be involved in observations, the college administrator reported that only two instructors had actually been able to visit any vocational classes. One of these had, in fact, done an excellent job.

During the interview it became obvious that the academic instructor had done little to implement a meaningful integration program in the classroom. The instructor stated the opinion that although vocational students generally were not as academically capable as other students, they certainly had every right to participate in the academic courses. To accommodate the vocational students, this instructor had "dumbed down" the course content for them. The instructor also took great care to point out that comments were made in class to the non-vocational students explaining that the vocational students had a right to be in the same class and express their opinions. The instructor considered this to be an example of introducing good human relations into the classroom. The major instructional change in this course as a result of integrating vocational students into non-vocational classes seemed to be the communication of learning objectives to the students. Vocational students, the instructor pointed out, respond well to this approach because it is one with which they are familiar.

The college's second objective, an assessment of the enrollment of vocational students in academic courses required for degree or certificate completion, has been completed. The college administrator reported that 70% of all occupational and career students take all of the academic and vocational courses needed to complete their program. During the on-site interview the administrator stated that placing vocational students in academic courses

meets the school's philosophy of integration, and concluded that there are no integration problems at Community College "D".

Community College "E"

Community College "E" identified four QAP integration objectives:

1. Complete integration of common transfer math courses across the CIM related technology training program.

2. Begin discussions with the physics faculty toward a common transfer Physics courses across the technologies;

3. Continue support for the Critical Literacy Project to bring writing and thinking skills to technology programs; and

4. Continue conversion of Communications course requirements from Technical Communications to transfer class communications.

The performance standards for these objectives were:

1. Approval will be shown and placed into the college catalog, and the schedule will reflect the section offerings;

2. Approval by ICCB will be shown and the revisions placed into the college catalog;

3. The number of participants will be reported; and

4. Approval by ICCB will be shown and the revisions placed into the college catalog.

According to the college dean, the integration philosophy at Community College "E" is to improve the academic standards of their career programs by cycling all students through transfer quality courses. (Transfer courses are courses that four year colleges will accept toward completion of their degree requirements.) The dean said that the decision to create common courses for the various areas of technical study was made because there are not enough students in each area to efficiently teach separate courses.

The college determined that the math requirements for the computer integrated manufacturing (CIM) curriculum would be used as the core for all areas whose instructional content is based on CIM needs. In practice, this includes virtually all of the industrial technology programs. It was further determined that these needs could be met through two courses: Technical Math and Trigonometry.

For further information on the math courses, the dean suggested contacting the math department head. In a telephone interview, the math department head described a different integration philosophy. The math department head considered it more appropriate to "off-load" discipline-specific math instruction to the departments from which the students came, and cited a health science math course as an example of this policy. The math department head was quite unsure that vocational relevance should be integrated into the math department's transfer quality courses. Nonetheless, the math department head confirmed

that Technical Math was an integrated course while Trigonometry was "only about half integrated." Because the Trigonometry course was not yet in conformity with the integration plan, it was decided that only the Technical Math course should be observed.

Based on direct observations, the Technical Math course did not reflect the principles of vocational-academic integration as operationalized in this study. Class began with the return and review of a test taken the previous week. The test required skills in addition, subtraction, multiplication, division, rounding, significant digits, exponents, scientific notation, and solving equations by substituting given values for variables. There were 35 items on the test, a few of which were word problems. Of the 35 items, only two could be said to have any overt relationship to technology. These questions dealt with "moment of inertia" and the conversion of newtons/hour to lbs./second. None of the 14 students in the class appeared to know what these concepts meant. Another question asked students to complete a division problem involving multiple variables.

No one in the class passed the test, and the mean score seemed well below 50%. The students appeared frustrated, confused, and discouraged. At one point during the review the instructor said that high school geometry was a prerequisite for working some of the problems on the test. When asked how many of the students had had that class, less than half of the group raised their hand.

After reviewing the test for about an hour, the teacher encouraged students to go back through the problems to see what they had done wrong. The instructor also suggested that they spend some time experimenting with their calculators so that they could familiarize themselves with where the various buttons were located. The instructor then moved on to the next subject: solving first order equations. The instruction included no explanation of how, when, or why this skill might be useful to the students; it was taught as a purely mental exercise. The instructor did try to engage the students in critical thinking and problem solving. However, the problems were so complex and the students' background so weak that they were unable to follow the logic behind trying to break down problems into simpler component parts. Further, the students were so busy trying to remember specific rules that they could not focus on proceeding through the problems in an orderly manner.

In response to a request from the observer for a brief evaluation of the class, the instructor was told that it seemed like a pretty traditional technical math class. The instructor smiled and said, "Yes, it is. It's the first of a three course sequence that will equal college algebra plus some." The instructor then went on to explain that the students performed poorly because they had been out of school for a while and that their high school preparation had been inadequate. The instructor did not recognize that these students were trying to complete a Technical Math and Trigonometry sequence, not a college algebra program. "But the will is there", the instructor said, "so we keep on trying."

The school's second objective, to replicate the math approach in the physics department, is currently underway. Physics department teachers are currently meeting with technical area personnel to determine appropriate course content,. The initial target date for implementation was Fall Semester 1991, but the dean said that the courses were more likely to be submitted for ICCB approval in the summer of 1991 and be offered in Spring Semester 1992.

The Cultural Literacy Project, Objective 3, is an effort to teach instructors how to integrate writing and critical thinking skills into all curricula. The program is being run by another community college. The training program is one year long and involves a year of follow-up activities. Faculty who choose to participate are given a stipend. To date, 15 of the full time instructors have participated and the administrator has observed that instructors who have taken the course include more writing activities in their coursework.

The fourth objective, which involves the replacing Technical Communications courses with transfer quality composition and speech classes for all Business and Industrial program students, was reported to be in effect beginning Spring Semester 1991. These courses, however, were not identified as being appropriate for observation as a part of this study.

Community College "F

The five QAP integration objectives at Community College "F" were:

1. Students will be assured of having a career-oriented curriculum available which emphasizes a balance of academic and vocational skills training;

2. Students will be able to apply academic, computer, and theoretical skills to practical job situations;

3. Students will be taught strategies to apply critical thinking skills to practical job-oriented situations;

4. Limited-English-proficient (LEP) students with deficient technical-language skills will be given the opportunity to take a developmental Vocational English as a Second Language (VESL) course to prepare them for entering challenging technical courses; and

5. Students in Electronics technology will be proficient in both technical and academic basic skills.

Attainment of these objectives was to be measured as follows:

1. The General Education Committee will develop a process which will assess each career program completer's mastery of general education objectives;

2. The course outlines will be submitted to the Director of Career Programs. Additionally, the Curriculum Committee will review the course specifications and submit them to ICCB for approval;

3. Course module outlines will be submitted to the Director of Career Programs for review and filing. Additionally, when modules have been incorporated into existing vocational courses the students will be surveyed to determine their ability to apply critical thinking skills;

4. Course materials, assessment procedures and instruments, developed as part of the activities under 4.1, will be available for review upon request from the Director of Career Programs; and

5. Selected Electronics students will be assessed at the conclusion of their technical core curriculum to determine their mastery of academic basic skills, along with technical expertise.

According to an administrator at Community College "F", the first objective was not originally part of the QAP project. However, since the college intended to carry out this activity anyway it was included in the integration plan. For what the administrator termed "a number of reasons", this process has been put off until later in 1991.

The college administrator cited changes in the electronics program (see also the discussion of objective five) and the creation or modification of several other courses as evidence of the second objective having been met. These courses are taught by career program area faculty or by academic faculty, depending on the needs of the vocational program. This reflects the college's philosophy of integrating vocational and academic instruction in whatever way is most appropriate to the particular needs of each course of study. The courses listed included a technical English course for LEP students (see also objective four), a math course for nursing students, a technical English course for students in technical career curricula, a computer science course for health care students, and an upgraded mass communications course. Some of these courses are currently being offered; others are scheduled to be phased in.

One of the courses that is currently being offered is Mathematics for Health Careers. The class follows the model of having an academic department instructor teach an academic class in a vocationally relevant way. According to the Math and Computer Sciences Department chair, other disciplines require similar content-specific math courses taught by the math department. Because the nursing program's math course was the only one recommended by the college administrator, it was the only one that was observed.

Mathematics for Health Careers is taught from a textbook/workbook developed by the faculty at the College. As a consequence of effective instructional techniques, students were observed to be engaged in all five target integration activities (reading, writing, mathematics, critical thinking and problem solving) during a single 105 minute class. The class began with the students taking a quiz. All of the items were word problems requiring students to establish ratios and use proportions. All problems were relevant to situations that might be encountered in a health care setting. The questions required both numerical and narrative responses. Rather than having students write in complete sentences, they were required to give their answer in appropriate annotated form.

Reading skills were required to decode quiz questions. They were also emphasized in the use of the textbook, which includes equations, word problems, and text. Lesson plans and notes in the teacher's book indicated that reading assignments are a part of assigned homework.

During the lesson that followed the test, students were taught analytical and problem finding skills. Written lab exercises provide an opportunity to practice using these skills. (For example, students must recognize that a patient on intravenous fluids receives no

calories from the saline component of a glucose-saline solution; the instructor explained that this is an important consideration when determining caloric intake. The ability of the math instructor to relate so well to the vocational interests of her students is indicative of the high level of integration observed in the class.) Students were shown how to work through other job-based situations and were also given paper and pencil opportunities to practice these skills. The instructor also stressed the difference between a mathematically correct answer and a practical answer (for example, specifying a calculated .0042857 gram dosage as 4.3 mg).

Although it is being met in some cases, as described above, the college administrator stated that the critical thinking skills objective (objective three) is not being met campus-wide. This was attributed to a lack of funding and it was predicted that the college would not be moving toward meeting this goal in the immediate future.

The VESL course described in the fourth objective is on schedule to be offered Fall Semester, 1991. According to the administrator, curriculum developers are focusing on vocabulary and technical area requirements that are common to most career programs and on general skills such as how to read a textbook.

The fifth objective, producing more technically and academically proficient electronics graduates, was introduced to satisfy a need seen by an electronics instructor. According to the electronics instructor, efforts to bring about these changes are currently being focused on a programming class for technicians. The changes made in this course are quite commendable and are fully in keeping with the spirit of vocational-academic integration. However, it appears that the curriculum development and implementation will occur over a much longer time span than was visualized when the performance standard was written.

Community College "G"

Community College "G" began its QAP integration program with three stated objectives:

1. To make liberal arts and science courses more relevant for vocational-technical education majors;

2. To increase vocational-technical education student enrollment in specially designed communication courses; and

3. To develop a speaking across the curriculum program.

The performance standards for these objectives are:

1. At the end of the semester students will be asked to evaluate each course (involved in the project) and compare team-teaching to the traditional liberal arts and sciences lecture course. If two sections of each course were offered, the evaluation could compare team-teaching with one teacher in the classroom;

2. Summary and outcomes of the meetings will be forwarded to the Dean of Vocational-Technical Education, Compare past and present enrollments in (the) selected communications course, and Document class visits and follow-up on student enrollment in special communication courses; and

3. Vocational-education directors will notify speech teachers of the courses requiring a speech or oral report, Faculty will evaluate students' ability to transfer speech theory to the vocational-technical education classroom, and Recommendations from the meetings will be forwarded to directors.

According to a college dean, the first objective is being met through the addition of practical activities into math and science classrooms. This is being done through attention to learning styles and cooperative learning principles through the use of such techniques as 4MAT lesson planning.

The second and third objectives both relate to improving students' oral communication skills. According to the dean, the major activity in these areas has been the implementation of a speech inservice presented to vocational instructors by the speech teacher. The focus of the inservice was to help these instructors develop their own speech techniques. Thus, this college is implementing two integration models: the inclusion of vocational relevance into academic curricula and the assignment of academic instructors to serve as resource people for vocational teachers.

The dean contends that any evaluation of the school's QAP integration program should focus on what is seen as its overall purpose: to fund staff development programs that will build a foundation upon which TechPrep efforts can be built. Indeed, it is in this area that the college's QAP program has been most successful. An on-site observation during a TechPrep meeting verified that the college is combining QAP and TechPrep grant money to bring together college faculty, University faculty, high school teachers and administrators from throughout the region, and local business leaders to form a working group that is guiding the TechPrep effort. During the on-site visit, the group divided into teams and developed survey questions that were used to collect data for their project's curriculum development effort.

By proceeding in a non-traditional way, this community college seems to be providing an almost seamless transition from QAP to TechPrep. At the same time, it is developing an approach to vocational-academic integration that could serve as a model for other colleges.

Community College "H"

Community College "H" specified one QAP integration activity:

Facilitate program planning and (sic) which responds to the needs of new and emerging occupations, continuity and coherence issues, and program articulation efforts with the local public schools. Task lists and other resources will be utilized. Integration of vocational programs and academics will be stressed.

The college listed four evaluation standards for their objective. They were:

1. Program committees will met (sic) regularly and recommendations will be documented in minutes of meetings;

2. Revisions to course curriculum will be documented;

3. Progress of program articulation committees will be reported and documented; and

4. Formal recommendations will be prepared for the System.

In February, a dean at this college was contacted to arrange for the review of the results of their integration activities and observe classes in which curriculum revisions would be evidenced. The dean stated that there were no classes in which the results of the college's integration efforts were evident and offered to send a memo describing the activities that had taken place.

Based on two conversations with the dean, it seems likely that the objective developed by the college has not been implemented and that the evaluation standards have not been met. However, this suspicion cannot be reported as a fact; it is quite possible that the dean is unaware of efforts to meet the standards. For example, during a March 13 telephone conversation the dean did not recall that a district-wide follow-up seminar was being presented on the 15th. The dean suggested that we contact a college administrator's office for a transcript of the meeting.

Efforts to reach the administrator were unsuccessful. However, a secretary confirmed that the March 15 meeting had taken place and suggested contacting another person for more information. In early April that person was contacted and agreed to send information describing the seminars. This information has not yet been received.

CONCLUSIONS AND RECOMMENDATIONS

Based on the interviews and on-site observations, it appears that the eight sites fall into three basic categories: those that are successfully implementing a broad based integration program; those that have had success in certain areas; and those that have made extremely limited efforts toward integration activities. The schools studied seem to fit into the following categories:

Level One - Broad and successful implementation:

Community College "B" - In all observed cases, students are benefitting from well designed and thoroughly integrated programs. There seems to be strong administrative support for integration programs in particular, and for sound instructional innovation in general.

Community College "C" - The vocational staff appears to be fully involved in integrating academic competencies into their classes. Further, significant efforts are being made to jointly involve academic and vocational staff in the integration process. A consequence of this effort is an obvious sensitivity on the part of transfer course instructors to the needs of non-transfer program students. This sensitivity has led to the consideration of traditionally vocational material in traditionally academic classes. There seems to be a genuine commitment to both integration and instructional innovation at all administrative levels.

Community College "G" - Their approach is comprehensive, is being fully implemented, and seems capable of satisfying broad based, long term integration

goals. The college administration has successfully brought together diverse groups and is working to implement the school's philosophy.

Level Two - Successful implementation in certain areas:

Community College "F" - While widely scattered throughout the vocational programs, the efforts that have been made have produced very good results. However, there does not seem to be a strong administrative commitment to integration.

Community College "A" - There are pockets of instruction that reflect a well developed sense of integration. However, other programs seem to have little concept of how to combine integration philosophy with effective instruction to achieve the desired results. It seems that successful integration may be the result of a tradition of successful instructional practice in certain areas rather than institution-wide commitment to the concept.

Level Three - Very limited success:

Community College "D" - One instructor is apparently doing an excellent job of integrating vocational material into certain courses. However, very limited supervision of other activities has led to minimal success in those areas. No effort has been made to use the effective instructor as a model for other departments in the college.

Community College "E" - This college seems to be doing a good job meeting its stated objectives. However, these objectives do not advance the concept of effective instruction through the integration of vocational and academic competencies. Further, an emphasis on integration is not being passed down through the chain of command.

Community College "H" - The administrators interviewed displayed an extremely limited interest in integration. Consequently, there are no obvious integration activities influencing instruction.

As a result of the study, five general conclusions may be drawn:

1. At some schools, the integration component of QAP has been so thoroughly merged with TechPrep and other local and state sponsored initiatives that it is impossible to say with certainty that one aspect of integration is totally QAP related and other aspects are totally unrelated to QAP. This is especially true at those colleges where the concept of integration has been fully accepted and where genuine, broad-based efforts are underway.

2. Those who see the greatest problems are usually the farthest along, and are working to resolve them. Those who see no problems have typically been quite superficial in their treatment of integration.

3. A variety of approaches to integration exist at the various sites. Almost regardless of the approach used, it is more likely to be successful if senior and mid-level administrators personally support the concept and actively and overtly promote it to their faculty. Conversely, the absence of administrative support almost universally coincides with poor classroom implementation.

4. Some colleges are successfully offering courses in ways that other colleges have either found or hypothesized to be impractical. The most obvious example is occupation specific math at Community College "F" and Community College "B" vs. the approach taken by Community College "E". While determination of the underlying causes of this variance would be an interesting study, such research falls well outside the parameters of this project.

5. Virtually all observed instructors who have come into contact with the concept of integration support the idea. This is true for both vocational and academic instructors. The only exceptions either recounted or observed involve teachers who do not appear to possess the skills they are being asked to emphasize and teachers who are trying or have tried to implement an integration program without sufficient training and support. This finding suggests the need for effective short-term and long-term inservice training for administrators and teachers.

From this analysis, it seems that the most useful future steps in furthering integration will involve identifying successful administrators and teachers and using them as in-service trainers for personnel at their own schools and at colleges where evolving integration efforts have been less successful. It is further recommended that subsequent activities be constructed so that the institutions involved will be more accountable to ISBE.